IN THE SPECIFICATION

Please replace paragraph 3 on page 6 as follows:

The method may further include initially directing the cutting tool into the earth formation at a ground surface above the formation and advancing the cutting tool to form a transverse portion of the horizontal bore transverse to the ground surface and a horizontal portion of the horizontal bore substantially parallel to the ground surface. The freeze zone is preferably formed to have a large enough diameter that it has sufficient structural integrity to withstand mechanical forces of the drill string as the bore transitions from the transverse portion to the horizontal portion without collapse of the bore. The method may further include installing a well screen or well screen and gravel pack within the horizontal portion of the bore while the freeze zone remains sufficiently frozen to prevent collapse of the horizontal portion of the bore. A casing is installed to connect the screen to the surface. A submersible pump may be installed in one of the transverse portion or the horizontal portion of the well bore. Alternatively, a vertical shaft may be provided between the ground surface and the horizontal portion of the bore. A vertical line shaft or submersible pump is then provided proximate to an intersection between the vertical shaft and the horizontal portion of the bore.

The horizontal bore cryogenic drilling method in accordance with the present invention eliminate the need to use conventional drilling muds which can both pollute the earth formations around a well screen and plug the formation to prevent the efficient flow of water into a horizontal well bore. The cryogenic fluid further allows freezing of formation around the bore hole which allows the earth formation to take on the character of hard rock. This not only improves the structural integrity in the vicinity of the bore, but it eliminates infiltration of formation fluid and eliminates exfiltration of drilling fluids. The cryogenic technique further provides a solid formation which enables the use of drilling hammers as an alternative to rotary drills which can speed construction of the bore. In addition, the frozen cuttings act like dry powdered rock, which can be more efficiently removed from a bore by a cryogenic drilling fluid. The technique also eliminates the need to install grouted casings across the radius of the bore hole where it transfers from transverse to horizontal, thus further speeding and simplifying construction of the bore. In addition, the cryogenic technique renders irrelevant encountering cohesive soils such as clay which might otherwise form problematic clay balls. Finally, physical

changes to the formation around the bore hole created by the cryogenic method are temporary. The formation will revert to its natural conditions shortly after circulation of the cryogenic fluid is stopped. By way of contrast, mud rotary methods require elaborate well development processes to remove the mud invasion from the formation and these processes have proven unsatisfactory.